Introduction

Health services are delivered by health workers. The achievement of universal health coverage and the health-related Sustainable Development Goals (SDGs) will depend substantially on improving health worker availability, accessibility, acceptability and quality. In the WHO South-East Asia Region, the urgent need to address health worker shortages, distribution and quality led to the commitment to a “Decade of Strengthening Human Resources for Health 2015–2024” (1, 2). Global attention to the health workforce is also high, following the High Level Commission on Health Employment and Economic Growth (3), and the WHO “Global Strategy on Human Resources for Health: Workforce 2030” (4), which provides policy options to strengthen human resources, including the potential of mid-level health workers in inter-professional primary care teams.

This short paper first reviews definitions of mid-level health workers. It then reviews the evidence on mid-level health workers. It is organized around four questions:

(1) What is known about the effectiveness and safety of care provided by mid-level health workers?
(2) What is the evidence on the range of services provided by mid-level health workers, and at what levels of care are they deployed?
(3) What is the balance of evidence between high-income, and middle- and low-income, countries?
(4) What is known about the introduction and continued implementation of mid-level health workers?

Definitions

There are multiple definitions of mid-level health workers because it is not a single occupational category (5-7), but most of them agree that mid-level health workers are those who have received shorter training than physicians (between 2–4 years) but will perform some of the same tasks as physicians (6, 8). Therefore a mid-level health worker is not a medical doctor, but provides clinical care (may diagnose, manage and treat illness, disease and impairments) or engage in preventive care and health promotion (8). There are wide variations across countries regarding their title, job description, content, duration and quality of training and the framework within which they work (9). Some of the titles associated with mid-level health workers are: some types of nurses (nurse practitioner, clinical nurse specialist, advance practice nurse, clinical practice nurse, practice nurse); midwives (registered midwife, community midwife); non-physician clinician (clinical officer, medical assistant, physician
assistant); and surgical technician (medical and surgical technician) (8).

Different types of mid-level health workers provide clinical care in different settings: the community, in a primary care facility, or in a hospital.

What is known about the effectiveness and safety of care provided by mid-level health workers?

We reviewed the published and grey global literature in English on mid-level clinicians according to the definition provided above. The key paper is a 2013 systematic review of quality of care of mid-level health workers commissioned by the Global Health Workforce Alliance (GHWA) (8). This identified 327 articles of which 53 met the criteria for inclusion. Six other relevant reviews between 2004 and 2017 were also identified, and their conclusions are included here, as are selected individual studies and commentaries thought to be relevant.

The overall conclusion of the 2013 systematic review was that “there is no difference between the effectiveness of care provided by mid-level health workers in the areas of maternal and child health, and communicable and noncommunicable diseases, and that provided by higher level health workers” (8). This means that for certain specific services, care provided by mid-level health workers is of similar quality to care provided by doctors.

Most evidence is from high-income countries (Australia, Canada, the United Kingdom of Great Britain and Northern Ireland and the United States of America). There are fewer analyses from middle- and low-income countries, with most being from Africa, but some from Asia. One other caveat is that the strength of the evidence in the 2013 systematic review was considered to be low or very low as judged by the standard systematic review GRADE criteria. This is quite common for analyses of health system interventions, where the gold standard randomized controlled trial is rarely possible.

What is therefore useful is that seven other relevant reviews come to broadly the same conclusion as the 2013 review.

- A literature review for WHO and GHWA in 2008 found that “...in a conducive environment, mid-level workers can make a vital contribution to improving access and quality of health care” (6).
- An analysis by WHO in 2010 of mid-level health providers states “evidence, although limited, shows that, where mid-level providers are adequately trained, supported and supervised, they can deliver essential health services including maternal and child health, HIV and other priority conditions with similar quality standards as physicians, and often for a fraction of the cost” (9).
- A 2009 review on the impact of non-physician clinicians and quality of care states that “non-physician clinicians working as substitutes or supplements for physicians in defined areas of care can maintain and often improve the quality of care and outcomes for patients” (10).
- A systematic review in 2014 on the substitution of physicians by nurses in primary care concludes “nurse-led care seems to have a positive effect on patient satisfaction, hospital admission and mortality” by reducing the overall risk of hospital admission and by reducing mortality (11).
There are two systematic reviews on “task shifting” (commonly now called “optimizing skill-mix”). This is defined as delegating tasks to existing or new cadres with either less training or narrowly tailored training, and one systematic review on substitution which is also relevant. These concluded that “studies provide substantial evidence that task shifting is an important policy option to help alleviate workforce shortages and skill mix imbalances” (12), “task shifting is an effective strategy for addressing shortages of human resources for health in HIV treatment and care” (13), and “physician substitution in health care for the ageing population may achieve at least as good patient outcomes and process of care outcomes compared with care provided by physicians” (14).

A recent Cochrane review 2016 on non-medical prescribing versus medical prescribing for acute and chronic disease management in primary and secondary care concludes that “non-medical prescribers were as effective as usual care medical prescribers” (15).

Therefore, the existing evidence reviewed above – despite its limitations – all points in the same direction. It suggests that mid-level health workers can provide similar quality of care and achieve similar health outcomes to physicians, and that the introduction, use and expanded use of mid-level health workers is a reasonable policy option for countries to address issues such as expanding coverage and access, shortage of human resources, retention of health workers in rural areas, international migration of health workers and efficiency.

What is the evidence about the range of services provided by mid-level health workers, and at what levels of care are they deployed?

There is more documentation of the use of mid-level health workers in noncommunicable diseases (NCD) (28 studies out of 53) than for maternal and child health (MCH) and infectious diseases (8). There are more articles on their role in secondary and tertiary care than in primary care, but there is useful information on both (8). However, this doesn’t mean that most of the mid-level health workers are at secondary and tertiary level.

Primary care

Most of the primary care studies analyse the role of mid-level health workers in maternal and child health and infectious diseases care, though there are some studies on noncommunicable disease care, and for overall primary care services. Studies have looked at technical quality, and also sometimes at patient satisfaction.

Results from one of the studies included in the 2013 meta-analysis on insertion of intrauterine devices by auxiliary nurse midwives versus doctors showed that there was no statistically significant difference between the two groups (8).

Four studies in the 2013 meta-analysis compared auxiliary nurse midwife care on abortion versus doctor care, and found no significant difference in the likelihood of an incomplete abortion, or an adverse event after manual vacuum aspiration between the two groups (8).

One study concluded that women were more satisfied with antenatal
care provided by midwives alone rather than combined care, but there was no significant difference between the groups in satisfaction with intrapartum or postpartum care (16).

- Clinical performance on integrated management of childhood illness (IMCI) by health workers with longer and shorter duration of pre-service training was compared in observational studies in Bangladesh, Brazil, Tanzania and Uganda in 2008. Results showed that IMCI training is associated with much the same quality of child care across different cadres of health workers, irrespective of the duration and level of pre-service training. The authors concluded that strategies for scaling up IMCI and other child-survival interventions may rely on health workers with shorter duration of pre-service training for deployment to underserved areas (17).

- There are also a number of studies related to care for noncommunicable diseases. An analysis of the capacity of non-physician clinicians to assess and manage cardiovascular risk in primary care, following the WHO cardiovascular risk management package, showed very similar results between non-physician clinicians and doctors. This result suggested that non-physician clinicians could be trained to assess and manage cardiovascular risk, and this is now standard WHO guidance (18).

- The above-mentioned Cochrane review states that “non-medical prescribers can deliver comparable outcomes for systolic blood pressure, glycated haemoglobin, low-density lipoprotein, medication adherence, patient satisfaction, and health-related quality of life” (15).

- In South Africa, a randomized controlled trial compared the effects of antiretroviral therapy (ART) care in patients managed by nurses and those managed by doctors. There was no significant difference in the likelihood of ART failure between groups of patients managed by nurses and those managed by doctors. Nor was there any difference in mortality, failure of viral suppression or immune recovery between the groups (19).

- In India, a study in Chattisgarh assessed the clinical competence of non-physician clinicians and physicians treating a range of primary health-care services. It found that doctors and rural medical assistants were similarly competent (20). Another study in India concluded that physicians and non-physician clinicians performed similarly in terms of patient satisfaction, trust and perceived quality (21).

## Secondary and tertiary care

- **Maternal care:** Thirteen studies in the 2013 systematic review found no significant difference in antenatal hospitalization rates when care was provided by midwives alone compared with care provided by doctors working with midwives. Episiotomy was significantly less likely with care from midwives alone. However, there was no significant difference in rates for the induction of labour, instrumental delivery or caesarian section. Similarly there was no significant difference between the groups in the rate of haemorrhage, fetal and neonatal, preterm or admission to the neonatal intensive care unit (8).

- **Chronic care (heart disease and diabetes):** The 2013 systematic
review found care provided by nurses in secondary and tertiary hospitals (mostly in high-income countries) was as effective as care provided by doctors. There was no significant difference between groups in need for a repeat consultation, improved physical functioning, attendance at follow-up visits or attendance at an emergency department after receiving care. Interestingly, one study from Sweden concluded that the likelihood of death at 12-month follow-up was lower with care from nurses and the likelihood of compliance with drug treatment was higher (22).

- **Surgical care:** Evidence from a study from Malawi comparing the outcomes of surgical procedures carried out by clinical officers (non-physician clinicians) and doctors showed that there was no significant difference in postoperative maternal health outcomes, such as fever, wound infection, the need for re-operation and maternal death, after emergency obstetric procedures performed by clinical officers or by doctors (23). A study from Mozambique comparing the outcome of caesarian sections between assistant medical officers and doctors showed that there was no difference in the indication for caesarian delivery and the surgical interventions did not differ in the two groups. The only difference between the two groups was that haematoma was slightly more common (0.35% vs 0.05%) in the group operated by assistant medical officers (24). A study in Tanzania found that among 1134 complicated deliveries and 1072 major obstetrical operations, there were no significant differences between assistant medical officers and medical officers in outcomes, risk indicators, or quality (25). Another showed that the training of assistant medical officers on comprehensive emergency obstetric care (CEmOC) “remarkably” increased institutional deliveries by 300% and decreased fresh stillbirth rate and obstetric referrals (26).

**What is the balance of evidence between high-income, and middle- and low-income countries?**

Much of the evidence comes from high-income countries. Among LMICs, there is most evidence from Africa. This is probably in part because the use of non-physician clinicians is long-established: 25 out of 47 countries in sub-Saharan Africa had non-physician clinicians (NPCs) in 2007 (27). In nine countries, numbers of NPCs equalled or exceeded numbers of physicians (Mozambique, Malawi, Tanzania, Lesotho, Liberia, Kenya, Rwanda, Uganda and Zambia). In general, non-physician clinicians were trained with less cost than were physicians, and for only 3–4 years after secondary school. Their roles varied between countries. All non-physician clinicians did basic diagnosis and medical treatment, but some were trained in specialty activities such as caesarean section, ophthalmology and anaesthesia. Many non-physician clinicians were recruited from rural and poor areas, and worked in these same regions (27). Therefore, many sub-Saharan African countries have taken a gradual but decisive shift to non-physician clinicians as a cornerstone for health-care delivery (28).

In Asia, there is less documentation, and experience also appears to be less widespread. In the South-East Asia Region, some of the countries where mid-level health workers exist are Bangladesh, some states in India, and
Nepal. The cadre of Assistant Medical Officer is being phased out in Sri Lanka due to the assumption that enough physicians exist to provide care in rural areas (29).

For example, Bangladesh employs Sub-Assistant Community Medical Officers (SACMO) to provide some of the primary care services. SACMO is a medical assistant (non-physician clinician) that has attended a three-year didactic and clinical training and a 12-month compulsory internship (30, 31). Two studies were found on experience in India (20, 21). One concluded that rural medical assistants are as competent as physicians in primary care settings. This supports the use of rural medical assistants-type clinicians for primary care in areas where posting Medical Officers is difficult.

What is known about the introduction and continued implementation of mid-level health workers?

The main challenges to implementation include adequate and sustainable training, support and supervision, adequate pay for staff in new roles, the integration of new members into health-care teams, role of health professional regulatory bodies, legislative framework, employment policies and procedures and opposition from existing professions.

Establishing a framework and mechanism for systematic supportive supervision of mid-level health workers becomes important to promote better job satisfaction and improve retention and their performance (32).

Mid-level health workers alone cannot produce largescale changes where there is a shortage of personnel. They should be introduced alongside other strategies designed to improve the quantity, quality, distribution and performance of the health workforce. Devising a rational skills mix is one policy tool among many that should be considered.

Conclusions from the literature

Health care provided by mid-level health workers in specific service delivery areas has been found to be as effective as care provided by physicians.

Mid-level health workers need to be well-embedded in the system, receive adequate training, support, recognition and pay. The different professional categories included under the term mid-level health workers should also be well regulated by competent regulatory bodies.

Relatively lower training costs, reduced training duration, and potential for success in rural placements suggest that mid-level health workers could have substantial roles in the scale-up of the health workforce and play an important role in achieving universal health coverage and the Sustainable Development Goals.

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References


